

## REMARKS

### I. Amendments

Each claim 1 through 6 has been amended. The amendments to the claims are made to provide some additional clarity to the claimed subject matter and to address the Examiner's §112 rejection of claim 6.

New dependent claims 27-35 are added to the specification, and a new independent claim 36 is added as well.

The following table presents a list of the newly added claims with the associated limitations of each of the claims and the relevant supporting disclosure by paragraph number of the published patent application.

Claim no.	Limitations	Support (paragraph of publication)
27	Individual metals and refractory oxide contents of composition	0042, 0044
28	Titania powder particle size	0023
29	Total metals content of the composition	0043
30	Composition as a coprecipitate	0020, 0047-0049
31	Titania in the anatase form	0022
32	Surface area of titania	0025
33	Loss on ignition of the composition	0068-0070
34	Composition that is calcined	0073
35	Composition formula	0027-0039

### II. §112, second paragraph, rejection of claim 6

This rejection has been addressed by the amendments to claim 6. Therefore, it is respectfully submitted that this rejection is no longer an issue.

### III. §102(a) rejection of claims 1-6 over Rocha et al. (US 6,383,975)

The Examiner asserts that, because Rocha discloses a catalyst composition having a gamma alumina support with a concentration of from 8 to 15 wt% group VIB metal and a concentration of from 1.5 to 5 wt% group VIII metal, and, further containing TiO<sub>2</sub>/(metal oxide from group VIB + metal oxide from group VIII) in an atomic ratio of 0.3 to 0.5, the Rocha

disclosure anticipates the Applicants' claimed composition. The Applicants, however, respectfully assert that their claimed composition is substantially different from the compositions taught by Rocha and, therefore, are not anticipated by the reference.

Rocha teaches a supported catalyst composition in which the alumina support has impregnated therein an additive for promoting physical and chemical stability. *See* column 3, lines 55-column 4, line 5; Example 1, column 6, lines 1-4; Example 2, column 6, lines 21-26; Example 3, column 6, lines 34-38; and Example 4, column 6, lines 45-50. The additive may be titania. *See supra*. The support is further impregnated with active metals. *See* column 4, lines 9-57, and the Examples. Rocha states that its supported catalyst composition "contains elements related in the following way:  $\text{TiO}_2/(\text{Mo}+\text{Ni})$ , atomic ratio of 0.01 to 0.6, preferably 0.3 to 0.5," *see* column 4, lines 58-60, and that the molybdenum concentration is from 5 to 30 wt % based on the total catalyst weight, and the nickel concentration is from 1 to 10 wt% based on the total catalyst weight. *See* column 4, lines 60-63. The compositions presented in the Rocha examples have titania contents at around 6 wt. %. *See* Table II at column 7.

One difference between the Applicants' claimed composition and the Rocha composition is that the claimed composition is "unsupported" whereas, on the otherhand, the Rocha composition is a supported catalyst. The Applicants have defined the term "unsupported" in their detailed description, *see* paragraph [0020] of the published application, where it states that the term "unsupported" excludes catalysts that are of conventionally formed supports that are loaded with metals. This conventional catalyst is of the type taught by the Rocha patent, but Rocha does not teach the unsupported form of catalyst. Another feature of the Applicants' claimed invention not taught by the Rocha patent is the requirement that at least 50 weight percent of the refractory oxide material must be titania.

The Applicants' inventive composition includes numerous other differences, in addition to those mentioned above, and is clearly novel over the composition taught by the Rocha patent. Thus, it is respectfully submitted that the claimed composition is patentable over the Rocha patent.

#### **IV. §102(b) rejection of claims 1-6 over Landgraf (US 5,945,372)**

The Examiner asserts that, because the Landgraf patent discloses a catalyst which includes titanium oxide and a catalytically active component selected from compounds of elements of the group consisting of molybdenum, tungsten, copper, iron, chromium and manganese, the Landgraf patent anticipates the Applicants' claimed composition. The Applicants, however, respectfully assert that their claimed composition is substantially different from the compositions taught by Landgraf and, therefore, are not anticipated by the reference.

It is significant that the Landgraf teachings appear to be directed to a composition that is a supported catalyst. The illustrations presented in the Landgraf patent are of catalyst structures, such as, a formed ceramic honeycomb, *see* column 4, lines 29-37, and of catalyst granules and pellets. *See* column 3, lines 23-25 and column 5, lines 17-24. The catalyst of the Landgraf patent must exclude the presence of cobalt and silicon oxide. *See* column 43-44, claims 1, 7, 8, and 9. The Landgraf listing of the elements that have catalytic activity, while including the group VI metals of molybdenum and tungsten, omit group VIII metals such as cobalt and nickel. *See* column 3, lines 5-11, and claims. This is in addition, as mentioned above, to Landgraf explicitly stating that cobalt must not be present in its composition. The catalytically active component of the Landgraf composition is not to be present therein in an amount exceeding 20 weight percent. *See* column 3, lines 16-22.

One difference between the Applicants' claimed composition and the Landgraf composition is that the claimed composition is "unsupported;" while, on the otherhand, the Landgraf composition is a supported catalyst. As mentioned above, the Applicants have defined the term "unsupported" in their detailed description. Another difference between the Applicants' claimed composition and the catalyst of the Landgraf patent is that the Applicants' catalyst contains a group VIII metal component, but there are no teachings by Landgraf that its catalyst may include a group VIII metal. And, in fact, the Landgraf catalyst must exclude the group VIII metal of cobalt. Moreover, the Applicants' composition may contain significant amounts of metals, as opposed to Landgraf requiring its catalyst to contain a relatively low metals content.

The Applicants' inventive composition includes numerous other differences, in addition to those mentioned above, and is clearly novel over the composition taught by the Landgraf

patent. Thus, it is respectfully submitted that the claimed composition is patentable over the Landgraf patent.

## **V. Conclusion**

In view of the above remarks, it is submitted that the claims pending in this application are patentable. Thus, early allowance of claims 1-6 and 27-35 is respectfully requested.

Respectfully submitted,

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